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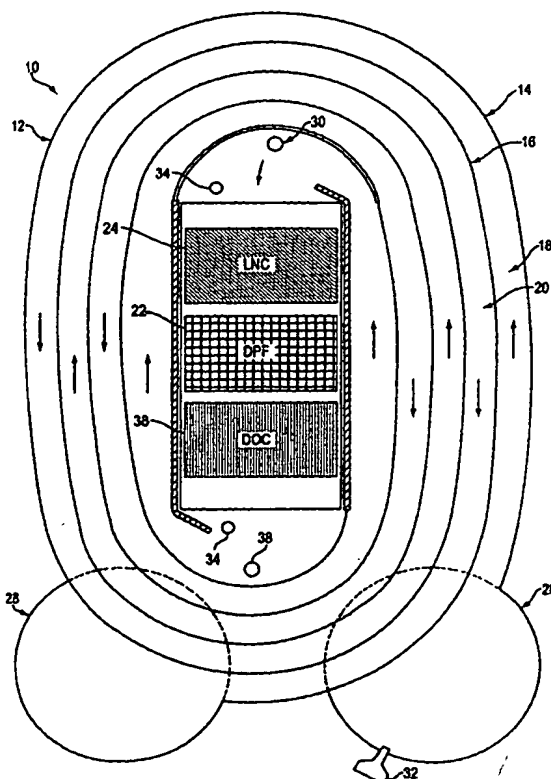
## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>7</sup> :</b> <b>F01N 3/28, 3/20, 3/035, B01D 53/94</b>	<b>A1</b>	<b>(11) International Publication Number:</b> <b>WO 00/28196</b> <b>(43) International Publication Date:</b> 18 May 2000 (18.05.00)
<b>(21) International Application Number:</b> PCT/US99/26050 <b>(22) International Filing Date:</b> 4 November 1999 (04.11.99) <b>(30) Priority Data:</b> 60/107,482                      6 November 1998 (06.11.98)                      US <b>(71) Applicant (for all designated States except US):</b> CERYX INCORPORATED [US/US]; 1343 East Main Street, Santa Paula, CA 93060 (US). <b>(72) Inventors; and</b> <b>(75) Inventors/Applicants (for US only):</b> PAGE, Dorriah, L. [US/US]; 1151 Corte Barroso, Camarillo, CA 93010 (US). EDGAR, Bradley, L. [US/US]; 293 Whitmore Street, No. 5, Oakland, CA 94611 (US). MACDONALD, Robert, J. [US/US]; 6200 Vista Del Mar, No. 207, Playa Del Rey, CA 90293 (US). <b>(74) Agent:</b> BRUEGGEMANN, James, R.; Sheppard Mullin Richter & Hampton LLP, 48th floor, 333 South Hope Street, Los Angeles, CA 90071 (US).		<b>(81) Designated States:</b> AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i>

**(54) Title:** INTEGRATED APPARATUS FOR REMOVING POLLUTANTS FROM A FLUID STREAM IN A LEAN-BURN ENVIRONMENT WITH HEAT RECOVERY

**(57) Abstract**

An apparatus and method to treat fluid streams, and in particular emissions from lean-burn engines such as diesel engines, are disclosed, which use multiple catalysts chosen to remove hydrocarbons, carbon monoxide, particulate matter, and oxides of nitrogen. The apparatus and method also provide for heat exchange between the inlet and outlet exhaust streams to sustain the catalyzed reactions, by placing the catalysts in the temperature zones where their operation is enhanced, and they also allow for regeneration of a filter used to trap particulate matter in the streams.



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